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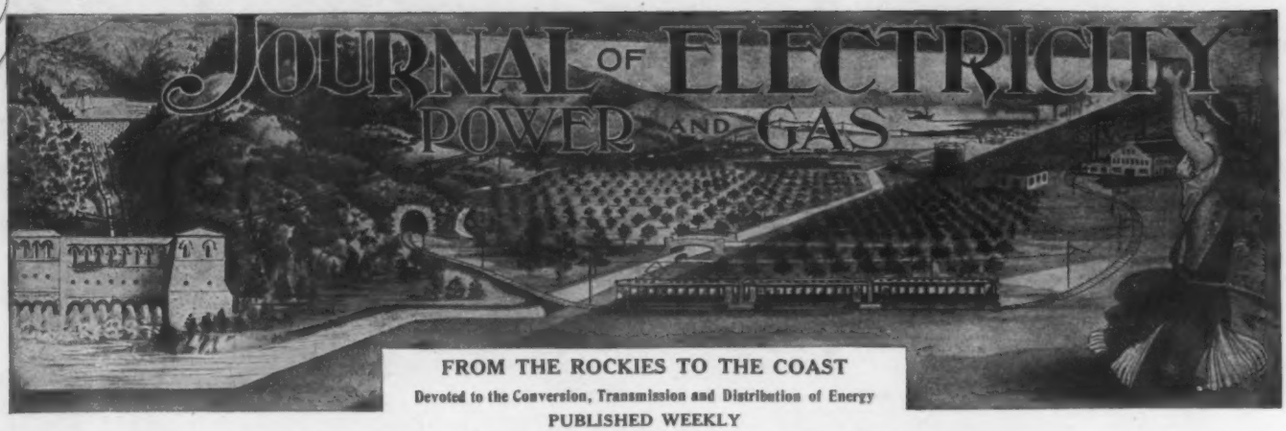
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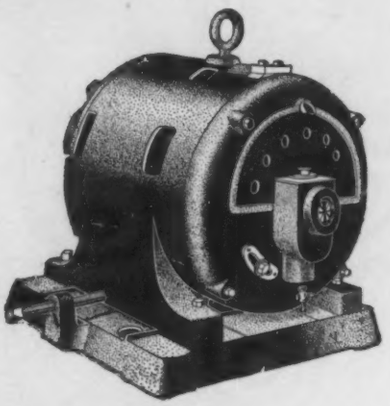

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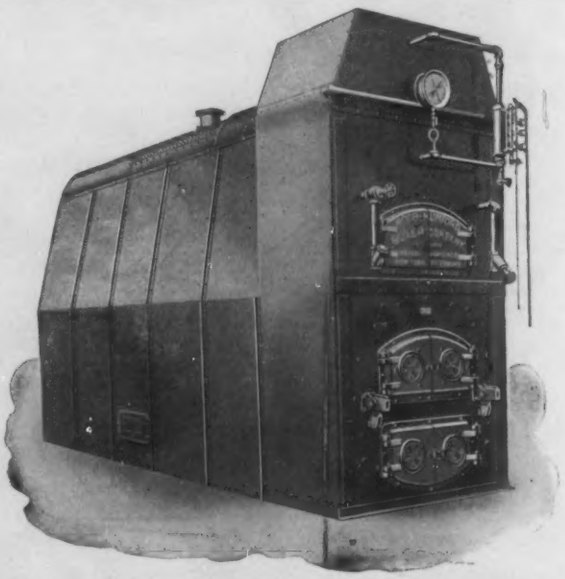

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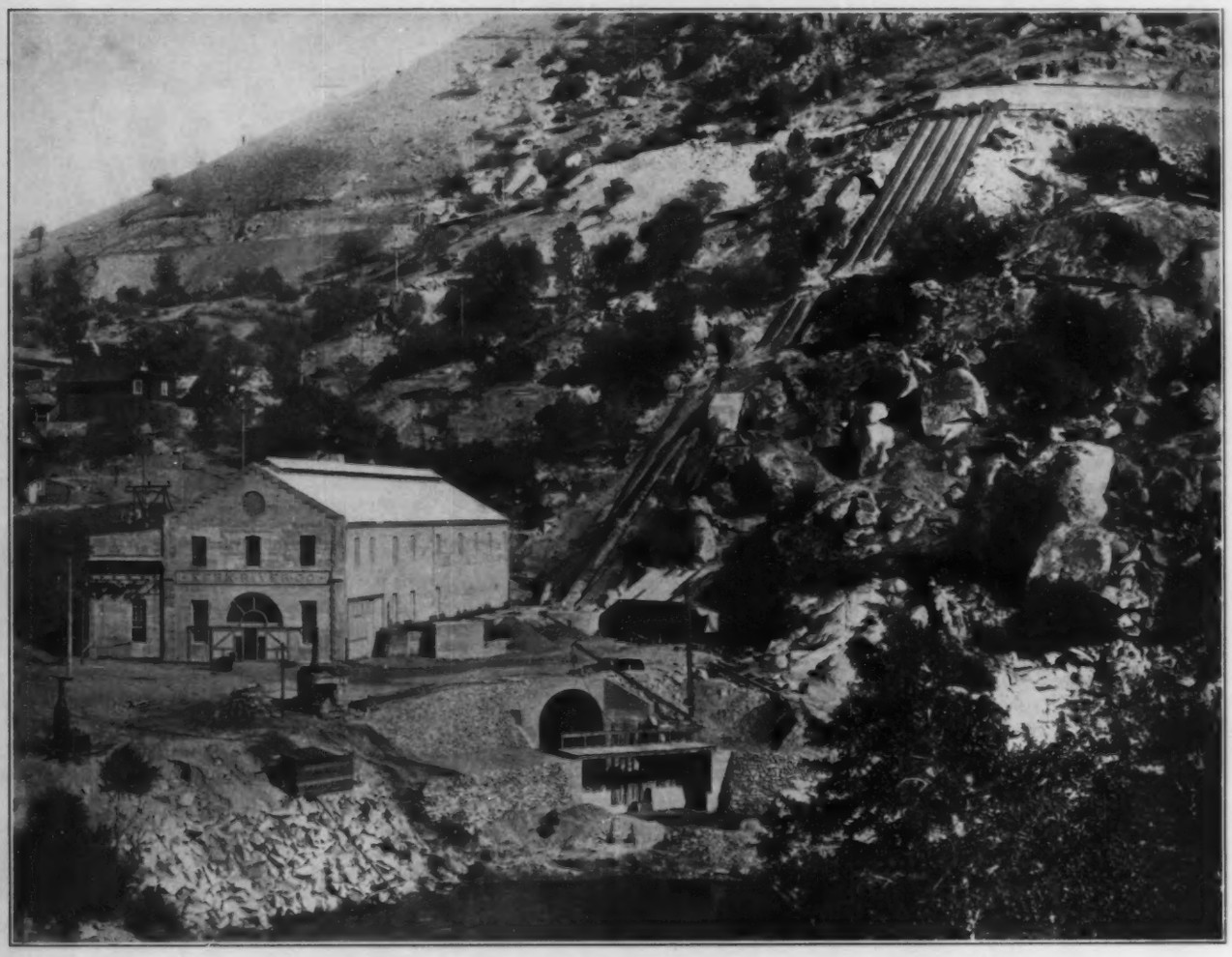
VOLUME XXI. SAN FRANCISCO, CAL., JULY 4, 1908 No. 1

Water Power Development in the National Forests. A Suggested Government Policy.*

By Frank G. Baum.

In order to insure the supply of timber and protect the water sheds and conserve the water of our mountain streams, the government some years ago adopted the policy of withdrawing large timber areas from entry by creating National Forests. The forests were to be operated by the forestry department for use and not for profit. Recently the government has given permits to companies proposing to make power developments, on condition that the permits be revocable at the pleasure of the Secretary of the Interior, and that there be a conservation water royalty charge by the government on the power output of the plant.

Objections to temporary permits have been made by the power companies, as no one wishes to invest money at the risk of losing it through the whim of some official. Objections have also been made to the conservation charge, especially when it is based on the output of the plant. In this paper I shall try to arrive at what I believe to be a logical conclusion of a fair conservation charge.



TYPICAL WATER POWER DEVELOPMENT IN CALIFORNIA.

The matter is of great importance because power development is advancing the progress of the country at an increasing rate, and a government policy retarding power development will hinder this progress. Power development stands to-day at the same

*A paper presented at the 25th annual convention of the American Institute of Electrical Engineers, Atlantic City, N. J., June 29-July 2, 1908.

stage, so far as its influence on progress is concerned, as the construction of railroads did twenty or forty years ago. The immense benefits to be derived from the development of cheap power and the resulting saving of our timber, oil, and coal resources, should not be deferred by an unfair government policy, or indefinite assurances for the safety of the money invested.

The proper development of water powers would utilize resources now going to waste; the development of coal mines, on the other hand, means the consumption of resources now stored and available at any future time. Every hydroelectric horsepower saves the consumption of about twelve tons of coal per year. Therefore the proper development of the water powers would conserve the country's coal resources to that extent. For example, 1,000,000 hydroelectric horse-power transmitted to New York and its vicinity for manufacturing purposes would result in saving about 12,000,000 tons of coal per year. This coal could be reserved for domestic purposes. This is about 20,000 cars of fifty tons each per month, or 666 cars per day. The development and use of less than twenty-five per cent of California's available water powers would stop all wood, oil, and coal burning for power purposes, including all railroads, in that State. The same is true for nearly all the Western States and a great many of the Eastern and Southern States.

In order to limit speculation, and at the same time to hasten water power development and to save our wood, oil, and coal resources, I suggest that all rights of way and lands necessary for this development be given on condition that a certain proportion of the work be done each year and that a certain proportion of the development be completed within five years. This would put the man developing the water power on exactly the same basis as the miner and the farmer; it would prevent speculation and limit the operations to bona fide developments. No man or combination of men, no matter how wealthy and greedy, would then be able to monopolize the water power resources of this country. The statement that there is now danger of a water power monopoly in this country is utterly absurd to any one having a knowledge of the facts or the conditions under which water power developments must be made. The development of our water areas would help to conserve the coal areas, and would protect the national forests, where water power is developed, at no expense to the government.

It will be assumed that the object of the proposed conservation charge is not intended as a means to raise a revenue for the government, but for the purpose of protecting, operating, and maintaining the forests, so that the greatest possible use may be made of them, not for this year or next, but with the idea of using the forests to produce a perpetual supply of feed, timber, water, etc.

It follows as a natural consequence that the different reserve sections must stand on their own merits; that is, the revenues in California, for example, should not be made so great that it would be impossible to use the revenue in the reserves in that section. In other words, it would be only fair that the revenue derived from a California reserve, say, should not be used to purchase, or maintain, a reserve in Maine.

It follows, further, that each reserve unit should stand on its own merits, and the money derived from any one reserve should, as far as possible, be used to maintain and promote the interests of that particular reserve unit. The people entitled to the products of the reserve, who should be given first consideration, would be those who settled in the country, many of them having *settled because of the resources in the reserves* adjacent to their place of settlement. Naturally, they should be entitled to first consideration in disposing of the products of the reserve. Those who settled in a particularly favorable location should not contribute to the reserves of a less favorable condition. This policy is, I believe, followed in giving grazing permits, and also in timber permits.

Coming now to a particular reserve. The reserve has resources mainly in feed, timber and water. The area of the feed and timber product of a reserve has no natural boundary. When we consider the water product, however, we find natural boundaries for each watershed, and logically to arrive at a fair and equitable basis for a conservation water charge we must consider each watershed by its natural boundary, and each watershed as a unit. The man wishing to make a power development should pay only a just proportion of the cost of maintaining the watershed and conserving the water. In a certain reserve, for example, there are two adjacent watersheds. The area of the two watersheds may be the same, and the water output also, but the cost of maintenance of the reserve lands in one shed be entirely different from that in the other; the value of the power resources in the two adjacent watersheds may be entirely different. Watershed A for instance, may have an area of 100,000 acres, a water output of a certain number of average second-feet, and the power which can be economically developed, say, 5000 kilowatts. Watershed B may have the same number of acres, but the economical power development may be 50,000 kilowatts. On the basis of a fixed charge per kilowatt-year, as proposed, watershed B would give a revenue to the government ten times as great as that of watershed A. The revenue derived by the government on this basis from watershed B from the power resource, is much more than justifiable, considering the cost of protecting and maintaining same, and much more than can possibly be used in that particular watershed for any purpose benefiting the power privilege. It is only fair that the government's charge against the power privilege should be based *on what the government furnishes* to make the privilege operative. The cost of maintenance in the case A might be very much greater than in the case B, yet the revenue derived from B, on the basis of a fixed charge per unit of output, would be ten times as great as the revenue derived from A. Some parallel examples will illustrate the principle of the proposed method of fixing the charge.

The Reclamation Service, in charging for reclaiming lands, apply to each district all the cost equally to all the lands to be irrigated. If one watershed district offers opportunities for developing a project for $20 per acre, that is the charge made, although in the adjacent watershed, or district, the charge may be $40 per acre. That is, the principle is recognized that *the people settling in a particular area are entitled to all the natural resources belonging thereto.* No profit can be made from one area and applied to another. Similarly in power development, the man who develops in one watershed is entitled to all the natural advantages belonging to that area, and he should not be made to pay to help develop power on an adjacent watershed. And none of the money contributed by him, because of his privilege, can be used rightly for any other purpose, except to benefit the watershed or privilege which he enjoys. The grazing and timber interests pay their just proportion of the cost to the government of the privileges enjoyed by them, and the power privilege should likewise pay its just proportion.

Suppose again that the government withdraws a given timber area in order to assure ties to several railroads that traverse it. What is a just charge for the ties? A charge on the gross or net revenue of the road, or a rate on the tonnage passing through the reserve would be absurd; the only fair charge would be on the value of the ties, calculated on the yearly expense of maintenance and the number of ties the reserve can produce annually. Why then should the water-power company pay a royalty on the basis of its power output? The grazing and timber interests are not taxed with the idea of producing a profit to the government, or that the grazing or timber interests of one section should support those of another, or that these interests should be taxed to support others. The miner is not charged a royalty by the government, but the government can rightly charge him for any direct benefit he may receive by reason of the reserves.

By all precedent, then, the principle is well established that the government should calculate the cost of what is furnished, and the conservation charge be made accordingly. This would establish the principle that the annual conservation charge should be based on the actual yearly cost to the government of the cost of conservation. The conservation charge would change from

time to time, but there would be a definite basis for its determination.

Rights-of-way on lands occupied for reservoirs, pipe-lines, and power houses should be sold to the power company at a fair value, and these lands would not then enter into the determination of the conservation charge. Rights-of-way and lands necessary for the development should be the property of the company. These matters should be fixed independently of the conservation charge. We should not expect railroads to open up new country if their rights-of-way were revocable, or if they were charged on the basis of tonnage carried over the right-of-way.

Coming now to the analysis of a particular watershed and the privilege granted to the power company on it: The withdrawal and protection of the timber will generally affect the stream-flow, and a just charge can be made by the government for the protection given, as it directly benefits the privilege. The charge made for the protection of the timber and the stream-flow must naturally vary with the conditions, and must be calculated for each case, because other interests should also pay their just charge for the protection. The charge made for the reservoir privileges, rights-of-way, for canals, pipe-lines, and power-house sites should, however, be based on the value of the acreage occupied. Because a power development occupies a given piece of groud, makes it no more valuable to the seller (the government) than if it were to be occupied by a quartz mill, and the power man should pay no more than the miner or any other interest.

When the amount to be charged for the right-of-way, reservoir, and power-house sites is fixed, and the government has determined the amount to be expended yearly on the watershed, the amount to be charged for the power privilege can be easily fixed. It should make no difference in the charge whether 5000 kilowatts is obtained in power, or 50,000 kilowatts. That is, as in the case of the farmer and the Reclamation Service, the man settling in the valley where conditions are favorable for low cost of irrigation should have the benefit of that condition. And the power man who uses his ingenuity and money to discover a better power development than another should also have the benefit of his enterprise. The government has not yet, and I hope never will, put a tax upon discovery, invention, and development.

Still further to show the reasonableness of a fixed total charge annually for a given watershed, we may merely cite the fact that if the charge is based on the kilowatt output, the man who puts in a cheap and wasteful system pays less than the man who puts in a more expensive and efficient system. Further, the man who sells his power for $20 per kilowatt-year, pays double the percentage paid by the man who sells for $40 per kilowatt-year. And again, the man who takes this power to a market, say 100 to 300 miles away, must pay to the government for the losses and expense in doing so, and pays more than the man who sells to the home market. The man who reaches out with his power is equalizing conditions, just as railroads equalize conditions by their transportation facilities, and should be encouraged and not taxed for doing so.

Coming to the case where the government owns part of the property necessary for the conservation and development, and part is owned by private parties, or the man making the development. For example, assume that the power company making the development owns a reservoir which controls the stream. Assume that this reservoir is the controlling feature of the development, that without it the stream is virtually worthless. It may even be that the reservoir is all that is necessary, and the protection of the timber could have no effect on the development, and its removal would not affect the development in the least. Has the government a right to make a conservation charge, when, as a matter of fact, the man is paying for his own conservation? In this case the government can only charge for rights-of-way and lands occupied, and no conservation charge can be justly made. If the government furnishes part of the conservation, this is usually the case—then a proper proportion of the basic rate of the conservation charge can be made.

This may be illustrated by taking the case of a man owning a timber area to which he had title before the establishment of a reserve. In order to make use of the timber it is necessary to obtain from the government land for a mill-site and right-of-way for a railroad from the timber to the mill-site. A proper charge for the land for the mill and right-of-way can only be made on the basis of the value of the lands occupied. A charge on the output of the mill would be entirely unjust; this will be admitted by all. Change the timber area to a reservoir, the mill-site to a power-house site, and the railroad to a pipe-line, and wherein lies the difference? The man purchased the reservoir before the reserve was established, to store water and develop power. In order to do this he must have the right-of-way for pipe-line and land for power-house site, and these must be granted him as in the case of the sawmill, on the basis of the land value, and not on a royalty of the power output. No royalty should be charged for giving the man the only opportunity there is to make use of his property. Any number of parallel cases could be cited to illustrate the principle. In creating a forest reserve the government cannot but recognize the rights of private individuals or companies who owned lands in the reserve previous to its establishment, and the government must allow owners the use of their property. Any other course would amount to confiscation.

The above suggested method of fixing the conservation charge is believed to be logical, and treats the power interests as others. The amount to be charged yearly for conservation would be influenced by only one fact; that is, the yearly cost to the government of maintaining the area benefiting the privilege, and what proportion of the charge should be borne by the power company? It eliminates all questions as to the efficiency of the development or the amount of development, and *hence would tend to make for efficiency and maximum use of the resources.* It eliminates the question of the market value or distance of transmission. The market value would, as it should, depend upon the natural advantages for power development in the district, and there should be no additional tax when high efficiency is aimed at or long transmission is undertaken.

Rights-of-way and property necessary would be a separate matter from the conservation charge, and property rights necessary for development would be not temporary but permanent. We should not expect a man to establish his permanent home and develop his farm if he is not assured title.

The above method of charging separately for lands and for conservation, and giving title to lands, would remove all objection on the part of investors, because then power companies would obtain title to grounds occupied by the development, and there would be a definite and fair method by which the conservation charge would be arrived at, now or at any future time. It is believed no logical objection could be raised to the plan by the power companies.

It may be contended by some that the government should obtain as large a revenue as possible for every development, and apply the proceeds for the general welfare, the argument being based on the fact that the government grants a privilege which cannot be enjoyed by others, and should receive a revenue in proportion to that derived from the operation of the privilege. The examples cited, however, make this position untenable, as the power companies should not be treated differently from the farmer, the miner, the lumber company, the railroads, or other interests. There is no monopoly in water power development, and the advantage gained by a man who does something should not be shared by the man not so progressive. It would be just as logical to make the thrifty farmer share with the less thrifty. Industry, progressiveness, and individuality should not be stifled or taxed.

Feed, timber, all crops, minerals, water and water products, and anything which nature produces, are primary producers of wealth. Why should water be classed differently from any of the other natural products in the government policy of development and control? *The general government cannot justly make a*

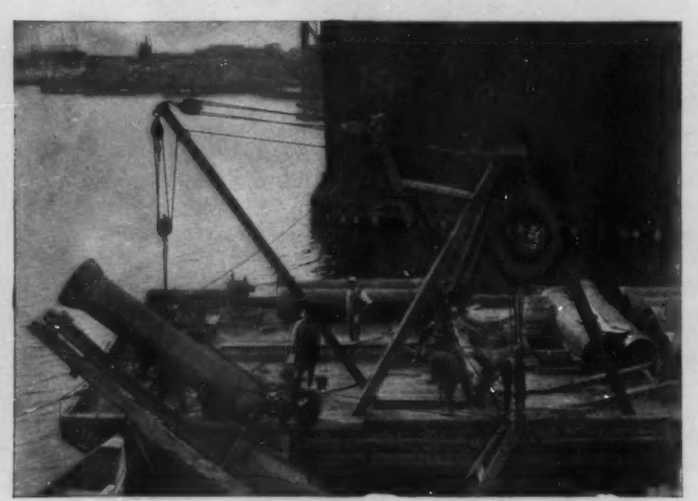
charge equivalent to a franchise tax or regulate rates; those privileges would remain with the State and subject to local laws, where the streams are under State control.

When the conditions of the past, present, and future developments of the country and its industries are considered in relation to the present and future developments of power, it is believed that the only tenable conclusion which can be reached is that the power interests must be treated as other interests and *charged for conservation only on the basis of the cost to the government of the thing furnished by the government,* and that rights-of-way and property required for the development should be the property of the company making the development. The only varying element, then, will be that due to the fact that the value of the property owned by the government is changing as time advances, and the conservation charge should be changed accordingly.

The conclusions drawn from the above discussion may be briefly stated as follows:

A. A proper conservation charge can be made only on the basis of the cost to the government of that which is furnished by the government.

B. The proceeds from any particular privilege cannot be devoted to any other watershed or any other section, or for any purpose except the particular privilege.



LAYING 24-INCH FLEXIBLE JOINT PIPE ACROSS CHELSEA CREEK, BOSTON.

C. The conservation charge will have a maximum limit at any given time, which can be determined by calculating the yearly cost of the conservation to the government. This charge can be fixed for a period of, say, ten years, and at the end of that time a re-calculation may be made, and a new conservation charge made yearly, to meet the changing cost of maintenance.

D. The question of the proper conservation charge is entirely a separate matter from the charge to be made for lands and rights-of-way for development, and the two matters should be kept distinct.

E. Rights-of-way and lands necessary for the development should be charged for on a fair basis of value, as would be determined if the lands belonged to private parties, and a value had to be set on them for the power purposes by a court, or a commission. Rights-of-way and lands necessary should be deeded outright by the government to the power company, and the only changing conditions then, as time goes on, would be the yearly conservation charge.

My suggestion for a government policy on water-power resources can finally be stated in a single sentence—encourage water-power development as much as possible, make a proper conservation charge, and make grants for rights-of-way and lands necessary for development permanent, on condition that a certain proportion of the work be done each year, and that a certain proportion of the development be completed within five years, when a patent for all grounds occupied will be granted.

SUBMERGED PIPE.*

For river crossings or intake lines, cast iron pipe are used with flexible joints. Underwater conditions usually determine the type of joint and thickness of metal in the pipe selected. Submerged mains are generally so inaccessible and so seldom duplicated in a given location, that the risk of failure for any cause should be minimized by a due regard for outside influences. Care should be taken to so locate river crossings as to avoid injury to the pipe from passing boats, and in shallow waters, from ice, drift and snags. Where damage to the main may result from these causes, that portion of the line liable to disturbance should if possible be laid in a trench dredged out for it. When necessary in laying to work from a barge or raft, current and tidal conditions should be noted, and provision made to hold the float directly in the line of crossing.

The photograph clearly indicates how a line of 24-inch flexible joint pipe, Type No. 2, was laid across Chelsea Creek, Boston, a distance of some 1,438 feet. As the pipe were jointed the barge was moved forward sufficiently to admit of placing the next length as shown.

OUT-FLOW PIPE, WITH TYPE 4 FLEXIBLE JOINTS, AS USED AT NEW ORLEANS.

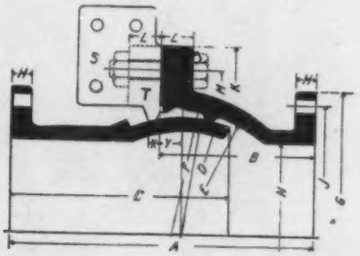
At New Orleans a special flexible joint, as shown in cut, with intermediate lengths of flange pipes, were used to make up two 36-inch discharge lines for the river end of a 48-inch cast iron sewage force main. The photograph shows one of these 36-inch outlets just before lowering, the curved end piece to be turned down-stream. The river end section of the 48-inch main, carried on a trestle of creosoted timber, runs out under an old wharf at the head of Spain Street, slightly above the mean gulf level. Near the end of the wharf, flanged connections divide the piping into the two 36-inch outlet lines which first have a vertical drop of some 18 or 20 feet and then curve out into the river. To clear the way for these pipe lines, old wharf piles were cut off by jetting alongside and using dynamite placed by a diver, and trenches for the pipe were cut out by a suction dredge.

In other flexible joint mains for river crossings and other deep waters, such a curve as is indicated in the photograph is sometimes necessary, where banks are steep and the bottom dips off abruptly, or, instead, one or two short lengths of flexible pipe may be used.

When it is necessary to carry an important supply across a river, to minimize the risk of failure in case of accident it is safer to put down two separate mains. The photograph shows the end of a 48-inch low service pipe line

*Contributed by R. W. Martindale.

divided into two 36-inch lines across Mystic River, Boston. Valves are placed at each end of the 36-inch pipe so that when necessary the flow may be maintained through one line while repairs are made to the other. As the river



TYPE OF FLEXIBLE JOINT USED AT NEW ORLEANS.

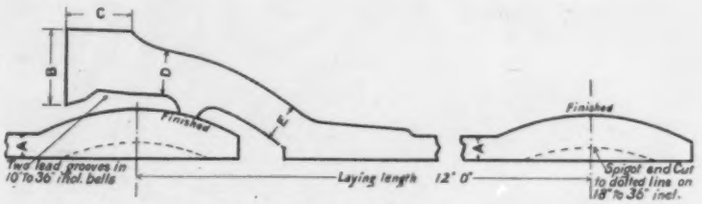
bottom was covered with mud for a depth of 10 feet or more, the pipe were laid on pile supports in bents 12 feet apart. For a distance of 100 feet under the channel, the pipe are about 10 feet below mean low water, rising gradually on either side. Here the shallow crossing permitted

LAYING 36-INCH PIPE ACROSS MYSTIC RIVER, BOSTON.

the use of a mixed line of three types of joints. They were first, pipe of the regular bell and spigot standard except that the bells were made with three grooves instead of one; second, were the same, with the spigots turned to a uniform slight taper so as to be interchangeable; and third, flexible

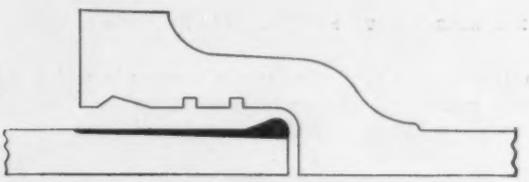
TWO 36-INCH PIPE LINES ACROSS MYSTIC RIVER, BOSTON.

joint pipe, as shown in cut No. 2, which were used where there were vertical deflections or future subsidence was probable. The pipe were put together on shore, in sections generally of six pipe, much as described later on under the subject of taper joint pipe, then loaded on the pipe-laying scow and moved out over the location. This scow was provided with two derricks, from which hung a stiff truss about 75 feet in length, to which the pipe were attached and then swung clear and to one side of the scow, and when the latter had been adjusted to the proper position the pipe were lowered and the taper spigot of one end of the section inserted in the leaded bell of the preceding section. The two sections were then drawn together by hydraulic power, and the taper joint between them calked by a diver.



TYPE OF FLEXIBLE JOINT USED AT MYSTIC RIVER, BOSTON

Taper Joint Pipe for submerged lines under moderate pressures, on comparatively level bottoms with easy off shore slopes, are usually ordered in sets of so many lengths having standard spigots and special bells, and a like number having standard bells and machined taper spigots, as shown in the cut, and usually, with twice as many lengths of standard bell and spigot pipe, the latter often with two or three lead grooves, depending on the proposed location of the line. In laying, a taper joint thus comes between every



TAPER SPIGOT.

two or three sets of the standard bell and spigot joints. If the line is put down in 48-foot sections, two of the special pipe and two standard pipe are required for each section. At the shore end, upon the wharf or barge, the taper spigot is temporarily inserted in the bell of a special pipe which will form the front or outward end of a section,

60-INCH PIPE ON PHILLIPS' PATENT CAISSON, READY FOR LOWERING.

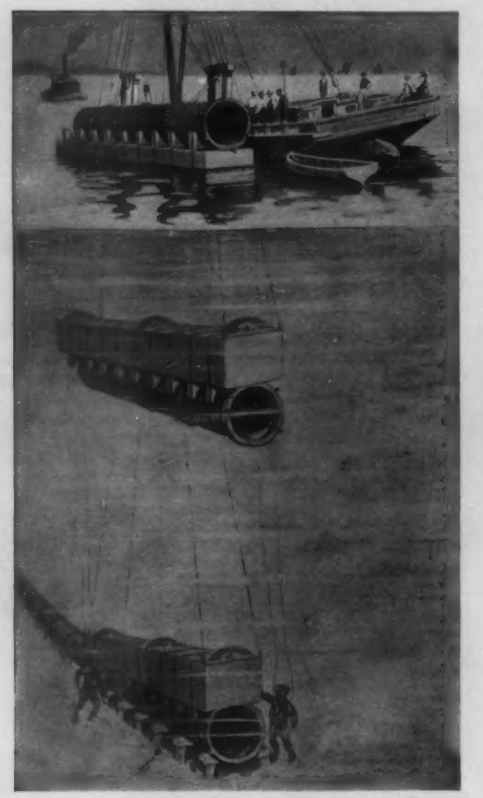
and the lead space run full with lead but not calked. The taper spigot is then withdrawn to be used as the rear end of the following section. The leaded bell is then fitted with a temporary collar, provided with guides to insure entry of spigot without injury to mold. The four lengths are then put together on the barge or float, the joints made in the ordinary way, and the float towed to the proper location for lowering, and once in line on the bottom, the section is moved so that taper spigot is drawn home into the leaded

bell of the preceding section. This is usually done by ratchet jacks or hydraulic power controlled by divers, who then calk the taper joint. Various methods for handling and lowering have been adopted, but as shown in the accompanying cut, the Phillips' patent caisson affords many advantages. The cut indicates the manner in which the two 60-inch cast iron submerged outfall sewage lines of the Metropolitan Water and Sewerage Board were laid. They extend to a point something over a mile beyond low water, the bottom of the pipe being placed at an average depth of 9 feet below the bed of the harbor, and each pipe rests on two pile supports. To accomplish this, the trench was dredged out to a width of 10 feet at the bottom and 30 feet at the top, and after they were laid, the pipe were covered in by material from scows. When floated out over the line, the section of jointed pipe was secured to the caisson, and which, as used, was 6 feet square by 52 feet long, divided into nine compartments which could be separately flooded. When empty this caisson would support 24 tons, and when filled it would sink. Hence, when carrying the pipe to sink, it was only necessary to partially flood the compartments.

BRINGING 60-INCH PIPE INTO POSITION FOR LOWERING.

30-INCH INTAKE LINE FLOATED INTO POSITION BEFORE LOWERING

When the caisson was released from the lighter, it would turn over, and when sufficiently flooded would soon reach the bottom, where, still attached to it, the pipe were adjusted to line and grade, the special joint drawn home and calked, after which the caisson was cut loose, hauled up and pumped out.



PLACING 60-INCH OUTFALL PIPE, USING PHILLIPS' PATENT CAISSON. METROPOLITAN WATER AND SEWERAGE BOARD.

Intake Lines, usually laid out into a lake or smaller stream, are not likely to be disturbed, except possibly by ice, and where the bottom is smooth, with a gradual slope, the main may thus be made up partly of flexible and partly of bell and spigot taper joint pipe, and in some locations the latter pipe of larger sizes, with bell and taper spigots alone, or interspersed with regular bell and spigot pipe, may be used. The accompanying views show a 30-inch intake main about 1,700 feet in length, laid about three years ago, which, as it was put together on the bank, was floated upstream into the desired position and then lowered on to the bottom 6 to 8 feet below the surface. Here the underwater condition and service admitted of using bell and spigot pipe.

30-INCH INTAKE LINE FLOATED OUT INTO STREAM BEFORE LOWERING.

CREDITS AND COLLECTIONS.*

By Mr. Peter Murman.

In treating the subject of Credits and Collections, I will endeavor to deal with it in a way applying directly to the Electrical Contractor rather than in the broader light of its relation to business generally.

In the electrical contracting business we have conditions that are not to be found in a general merchandise business. Some of these conditions are in our favor, while others are against us; and it is obvious that the greatest amount of good will accru when we take every advantage of those conditions which are favorable to us, and place every possible guard around those which are unfavorable.

Naturally, the first part of this subject to be dealt with is Credits. As the conditions of the trade have not thus far been advanced to a point where we can ask a customer for a deposit in advance, it behooves us to make thorough investigation before we start work, to the end that our accounts may be good. The importance of this is the more strongly manifested when we consider that a great part of our investment in a job represents hard cash paid out week after week for labor; and when on top of this it is remembered that owing to keen competition and other conditions the Contractors as a whole are not permitted to make a profit commensurate with the outlay of hard cash during the progress of a job, the importance of safeguarding one's accounts becomes at once apparent.

Let us first deal with direct Contracts with the Owner. Bids have been sent in, we are notified that we are successful, and are requested to call at the office of the architect to execute a contract. While it is not the general practice of an owner to erect a building without seeing his way clear to pay for same, conditions existing the past six months have shown us that some owners are either careless in making their financial arrangements, taking a great deal for granted, or the parties from whom they intend to borrow are irresponsible and not men of their word. In view of experiences that most of us have had with owners falling down on their last payment it is not amiss, nor inconsistent, at the present time, to inquire of an owner as regards what arrangements he has made for prompt payments as they fall due. This may seem a delicate question, and it is, but it is so important that it should not be taken for granted by a contractor that the owner has the money and that he will pay promptly. This should be determined, and the only way it can be determined is to ask questions. It might be argued that the owner, being desirous of getting his building completed, will, of course, say that he has the money, but the fact of him saying this can be used as a strong argument, and a leverage, if, when the time comes for the final payment, he wants to stand you off. The contractor would then be in a strong position to argue effectively that if he had known that the money would not be forthcoming at the proper time he would not have taken the job for the reason that he is not in a position to carry the owner. And while such argument might not secure him his money immediately, still he could plead so earnestly that the owner could be put in such a frame of mind that the contractor might get a preference when funds were available. On the other hand, if no questions were asked at the outset the owner would very likely argue like this: "When I started this building I had every assurance of getting the money necessary to complete the building, but believing at that time that there might possibly be a hitch I placed contracts with only those people whom I felt could carry me should I have to ask such a favor. That is the way I felt about you. I know that you have been in business a long time, and I thought that you were well able to carry me for a short time, and I even believe now that you can do so without seriously inconveniencing yourself, etc., etc." This argument, of course, could be offset, but a contractor would certainly not be in the same position to argue his case as he would be had he in the start gone thoroughly into the matter of prompt payments. I have found, in discussing this feature of our business with fellow-contractors, that there is a feeling existing that a course of this kind would not be approved by the owner, and that the architect might consider it a reflection on himself. This is unquestionably the wrong view to take of the matter, for the reason that while we must depend upon the owner for our business, our business is nevertheless a legitimate one, and we have certain rights which, if presented properly, are bound to be respected. There is a dignity connected with any legitimate business which should be upheld, and the more this dignity is upheld the more respected the contractor will be, and his treatment by owners will be more reasonable and more profitable. The idea that because one man works for another he should not be respected is a theory that has been exploded many times, and while occasionally we will meet owners and their representatives, the architects, who are inclined to consider themselves quite above us, I am sure that by the majority we will be more thought of for insisting upon our reasonable rights.

Now, about the General Contractor: So far it has been my experience that a great deal of worry is not necessary when dealing with the larger contractors, a dozen of whom might be mentioned, for the reason that in most cases these contractors are operating as agents for the owner, and their contracts covering the erection of a building are executed on these lines. Generally speaking, this means that the contractor simply handles the money for the owner, and directs the work on the building, but so far as the real responsibility in the matter is concerned, you are dealing with the owner. I do not know what the experience of other contractors has been, but thus far we have nearly always secured payments on a basis of seventy-five per cent labor and material installed, the 1st and 15th of each month, and these terms have been adhered to. However, should at any time when we have one of these contracts on hand the payments fail to come through, we would be particular to enquire the reason therefor, and if in our opinion the general contractor was not telling the whole truth, we would certainly make it our business to see the owner and ascertain directly from him the cause of non-payment. If in such a case the owner was making payments promptly and regularly to the general contractor, he would, of course, immediately investigate and want to know why sub-contractors, upon whose work the general contractor was getting payments as well as on his own work, were not getting *their* money. Such a course would immediately bring the matter to a climax and the general contractor would have to pay. If, on investigation it was found that the owner was not making payments to the general contractor, then it would be a matter for careful consideration as regards just what course should be pursued. While in the foregoing I have intimated that doing business with large general contractors is safe, this intimation deals only with those whom we have all come to know about by reason of the amount of work they have done, and is based on the fact that a general contractor cannot continue to do business if he does not pay his bills. If, however, the electrical contractor comes in contact with a new concern whom he has not done business with, and whom he does not know by its reputation for square dealing, he should make it his business to find out who they are, what they have done, and what money they

*Paper read before San Francisco Branch National Electrical Contractors' Association.

have. This is information which he is entitled to, just as much as a jobber is entitled to know our standing, and speaking for myself I should say that if I could not thoroughly satisfy myself as regards the responsibility of the general contractor without going direct to him for the information, I would not for one moment consider taking a job if he seemed to be the least bit inclined to conceal facts as regards his standing.

Right here it might be well to mention the Lien Law, because I have heard contractors say that they do not worry much about who they trust, because they feel they are protected by the Lien Law. This remark can only come from an inexperienced man. The Lien Law, of course, often protects us, but it is far from safe to depend upon this protection for the collection of an account from a party who at the outset shows that he is not as responsible as he should be. My experience with the Lien Law has thus far been very favorable. We have used its provisions for the collection of some large amounts, but I would never think of opening an account with a party whom I felt it would be necessary to use the Lien Law on to finally get what would be due us.

This brings me up to the small general contractor—the fellow who erects flats, small apartment houses, residences, etc. In my opinion, he is the man that we have to watch closely. First, because a great many of this class have but little money, and secondly because their business is not of sufficient size to warrant the establishing of an office, and to see them one has to do considerable chasing about the city. When we deal with a contractor of this kind for the first time, we always investigate him thoroughly; there is no beating around the bush; we start in on him something like this: "We are glad, Mr. Blank, of this opportunity of doing business with you. We have been very successful in securing a great deal of work, and all work which we take is on a basis of giving our customer a square deal and a first-class job. All we ask in return is that payments be made promptly in accordance with arrangements entered into. This is a point which we insist on. We do not doubt but that our business relations will be mutually satisfactory, but we feel that they will be all the more so when we thoroughly understand each other. Now we have never done any business with you before, and, as we are rather careful in whom we trust, we would like to have some references from you. Who do you buy most of your lumber from? Who do you favor with your hardware business? What plumber have you found to be the most reliable?" After getting these questions answered, we suggest various things to secure further information. For instance, if you want to get a line on how long he has been in business, say to him: "I suppose, Mr. Blank, that right after the fire you were pretty busy on temporary work. Did you get much of the Van Ness Avenue business?" Then if you want to find out what kind of people he is doing business with, say to him: "Do you find that wealthy people are holding you up on payments—giving you the gag that they cannot get money, etc.?" Or, "Have any of your customers had any trouble in getting money out of savings banks?" By putting enquiries to him in this way one can often get a good deal of valuable information, because he does not suspect that you are drawing him out, while all the time he is giving you exactly what you are looking for. Of course, the information you get from him in this way will govern you as regards just what you should further say in connection with payments. If you find he is doing business with good people, and that he is frank in speaking of his business, it is nearly a foregone conclusion that the fellow is all right. Now, as regards the references which he might have given you: While the parties referred to will often speak to you on the telephone regarding the man, I have found that it is far more satisfactory to go to the office and get the information. The party referred to is face to face with you, and in nine cases out of ten will give you more and better information than he would on the telephone. This calling at offices, of course, takes time, but that old adage, "An ounce of prevention is worth a pound of cure," works out exceedingly well in cases of this kind.

While I have not adopted a course of confirming verbal acceptance of bids, I think it wise to do this, even to the best customers. A short letter, as follows, I think would be very effective, and would do away with any possible misunderstanding:

Mr. Blank.

Dear Sir: We thank you very much for your order instructing us to proceed with work in building at so-and-so and so-and-so, covered by our bid of such-and-such a date. The conditions, as we understand them, are as follow: Amount of bid, so-much; terms, seventy-five per cent when rough-in work is done, and balance when our contract is completed.

As a matter of protection to ourselves, we have found it necessary to instruct our journeymen not to make any changes in, or additions to, the original layout, without a signed order from the contractor. We therefore respectfully request, Mr. Blank, that in the event of your wishing any changes or additions you will not hesitate to sign an order which our journeyman will present; and at this time we want to assure you that you will be treated absolutely fair as regards such.

Not hearing from you to the contrary, by letter, we will understand that the terms and conditions as set forth are perfectly agreeable to you.

Trusting that our work will be so satisfactory to you that you will see fit to favor us with future business,

We are,

Yours very truly,

A letter of this kind would not entail a great deal of work, for the reason that a number could be struck off on the multigraph or mimeograph, and in such case it would only be necessary to fill in the name, address, and a few words. It will be seen at a glance that the customer is informed of the terms covering the contract, and also that if he wishes changes or additions, he must expect to pay for them. I do not think that a contractor could raise any serious objection to a letter of this kind, and supposing he should it could be explained that it is a part of the working system of your business, and that in order to make the system effective, it must be carried out in each case.

So much for the contractor. Now, let us consider the individual who wants a little work done, a few additional lights here and there, a switch put in, or some changes made. The value of the work does not warrant an investigation as regards the responsibility of the party placing the order. Our plan in a case of this kind is to secure, on one of our regular order blanks, a signed order for the work to be performed. Our order form is made to cover either percentage work or a contract, and by signing the order the party agrees to pay for the work on completion. We are not satisfied, however, to alone have this provision set forth on our order form, but we have it distinctly understood beforehand that as soon as the work is done we shall have our money. Since we have adopted this scheme we have not lost one cent on work of this kind. As soon as the job is done the superintendent so reports, a bill is made out and it at once presented to the party. Of course, one is liable to meet a clever fellow who will get out of paying right away, but as a rule that fellow's business is so small that in dealing with him you do not have to consider what his future business is worth to you, and you can forthwith go at him in a way that will produce the money. At least, I have found this to be the case.

In the foregoing remarks I have not treated with personality. Here is an element that is worthy of much consideration for the reason that it must often be taken as a basis for extending credit when the fellow who is just starting out for himself wants you to do a job. He has very little money, no experience, but some ability. You must then depend entirely upon your own judgment and your impression of the man. In such cases, it is well, however, to always bear in mind that an honest failure causing you loss does you no good, and that sympathy and sentiment are best applied outside of a business deal.

This brings me to Collections. It is manifestly unfair that after credit is extended a customer the party giving the credit should have to spend time in calling for what is justly due him. I believe much can be accomplished in educating one's customers to the fact that it is desirable to send remittances by mail. I feel that we have done much in this direction, as even now, when every one is crying "hard times," fully eighty per cent of our remittances come by mail. We even go so far as to send certificates to owners, requesting that they mail us a check, enclosing for their convenience a stamped, addressed envelope. I think the honest man likes this method better than any other. He knows that the money is due, and he knows that the creditor should not be kept out of his money longer than necessary. He therefore has no objection to meeting your request, and you make it handy and convenient for him by enclosing the stamped envelope. There are always, however, a number of one's customers who have to be called upon for the amounts they owe. This does not necessarily stamp them as irresponsible, but they are nevertheless behind the times and present-day methods.

There is only one way to collect money, and that is to go about it with enthusiasm, just as a good salesman goes after an order. A good collector always believes that his house has fulfilled their part of the contract, that the money is due, and that there is no good reason why it should not be paid. He does not go out with an idea of seeing whether he can get money or not, but he goes after it with but one belief—he will get it. If he is to be disappointed he must know why, and some satisfaction must be given him in the way of a future date when he may call and get the money. I have always found it advantageous, when refused, to ascertain a time at which it will be agreeable for the party to pay. A record of such appointment must be made, and it is necessary that you carry out your part of the understanding by being on hand at the particular time stated. Then, if you are turned down again, you can argue that you were promised the money at this particular time, and that you have inconvenienced yourself by calling again, only to get the same reply. The party approached must always be left with a feeling that he owes the money and that he is inconveniencing you by not paying it.

When a bad customer is met, no time should be lost in exercising one's legal rights towards getting what is justly due him. I do not know of a case in my experience where it has been profitable to fool along with a party who continually makes promises only to break them. Just as soon as you are convinced that he is not desirous of doing the square thing by you, go after him. You had better do it early, because you will only have to do it later, and the longer you hold off the weaker your case becomes, because the circumstances gradually slip away from you, and in case of suit it may be that your most important witness is not to be had.

I have always found it advantageous and profitable to write letters in connection with overdue accounts. If letters that will bring home the money can take the place of personal calls, it is easily seen where the saving comes in. Outside of this there are other good features. In the first place, the letter carries a request for the money, and the party addressed cannot take up your time arguing with you. All that he has is the letter, and the letter lets him know that you are waiting for the money. Secondly, the copy of the letter gives you a good record; it tells you what time you made the request and what you said. In the case of a party who refuses to pay in the end, and you find it necessary to take legal steps to recover, you have a chain of evidence which should be very convincing to any judge or jury.

It is of the utmost importance, though, that care be used in framing letters of this kind, as many people—a lot of them honest—are very touchy in a matter like this, and loss of trade might follow if a letter contains too much at the wrong time.

I have successfully used a line of letters, a description of which follows, on customers whom we are not absolutely sure of.

First letter: Politely calling attention to bill of certain date remaining unpaid. Stamped return envelope enclosed for reply.

Second letter: Refers to first letter and date of bill. Attention is called to terms. Sets forth that quite a percentage of the account represents cash paid for labor. Requests attention be given matter.

Third letter: Refers to previous letters and date of bill. Request for remittance right away. Labor is cash. Our bills must be paid. Money only will pay them. Request that our position be considered.

Fourth letter: Refers to previous letters. Attention called to length of time account has run. Sets forth that our work was performed well and according to contract; that we caused no delay in completion of building, etc.; that debtor is not carrying out his part of contract; that there is no good reason, so far as we are concerned, for delaying remittance, etc. Finishes with a demand for immediate settlement, and a suggestion of next step.

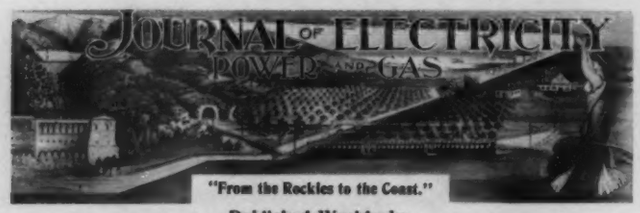
Fifth letter: Refers to previous letters. Describes action of debtor as discourteous and dishonorable. States that if not paid at once, lien will be filed.

Of course, it is only in very few cases where a line of letters of this kind have to be sent out. We nearly always get the money long before the lien letter. As mentioned earlier in this paper, there are always some good customers who wait until they are asked before paying. We have found that it is not necessary to call on these fellows, but a letter stating some reason for wanting the money has usually been productive. A large pay-roll, the arrival of a carload of material, disappointment in collections which were figured on, a note which has to be protected, are all good reasons that appeal to the fair-minded man.

Now for something about notes: During this financial stringency I dare say we have all had to deal with parties whom we know are wealthy, but who have been disappointed at the last moment and have been unable to come through with the money they owed. While there should not be the slightest ill feeling on the part of an owner, nor should one's interests be in the least jeopardized, still we all know that it would be far from profitable to file a lien in every instance when the money is not paid according to agreement, or before the time for lien rights expires. The question is, then, what is best to do. Personally, I believe in the taking of notes to cover the amount owing. This for the reason that in the event of the death of the debtor, you have a good and indisputable claim against his estate. In other words, his note establishes the account, and, generally speaking, there can be no question as regards the liability in the matter. Secondly, it is clearly set forth on the note that interest at a certain per cent is to be paid on it, and this is far better than depending upon the generosity of the owner when finally he does pay your claim which has not been covered by a note. You can see there is a marked difference between the two. In the first instance he agrees to pay interest; in the second instance he has not agreed to pay interest and you would be so liable to feel elated that he has paid that you would not think of asking him for interest. Then, again, should you get in a pinch you might be able to discount the note at the bank, or should you get in a bad way you could hand over the note to one of your creditors. In taking notes, however, one should be careful to see that they are properly executed, and it might be well right here to say something in connection with this very important feature.

Let us first see how a note is defined by the law of this State. It says it is "an instrument negotiable in form, whereby the signer promises to pay a specified sum of money." But while it is defined as an instrument negotiable in form, it may be not negotiable and still be a promissory note, and so the law and commercial practice recognize two forms—negotiable and non-negotiable.

(Concluded on page 11.)



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As this issue has dealt primarily with hydraulics, even Mr. Murman's article concerning liquidation, so will our next be devoted to telephone matters.

EDITORIAL.

WATER CONSERVATION.

Since our remarks of last December concerning taxation for water conservation this subject has been brought to the attention of the authorities at Washington by several Western engineers. Among these has been Mr. Frank G. Baum, who recently returned from a conference with the Forester, whom he found much interested in the situation, but slightly misinformed as to local conditions. He had evidently "built a garment out of the pattern of an Idea, and trusted that Nature would model a material shape to fit it." Yet Mr. Pinchot is too deeply interested in the rational utilization of our natural resources not to be open to a reasonable argument.

Both sides have proposed radical measures. The Government insists that the water royalty charge be based upon the power output of the plant, and that temporary permits be granted, revocable at the pleasure of the Secretary of the Interior. On the other hand, some of the power companies contend that permanent title should be given without charge. A hydro-electric development forms one of the most important factors in the preservation of forests, which act as a balance wheel to stream flow, both being mutually inter-dependent. Admitting the wisdom and necessity of some charge for conservation, Mr. Baum suggests elsewhere in this issue that it should be made on the basis of what it costs the Government, and that the proceeds be applied directly toward improving the district taxed. He asks that title for rights of way and lands necessary for development be granted on condition that a certain proportion of the work be done each year and a certain proportion of the development be completed within five years. He says nothing about a further charge for the use of the water, which more properly comes under State dominion.

These suggestions will probably form the nucleus for a discussion to be held at a proposed conference of those interested. The matter is to be introduced at the next session of Congress, and concerted action is necessary for adequate presentation. The present rulings of the Forestry Department threaten to destroy further water power development in the forest reserves, but will probably be modified to foster it. Predatory exploiters are following certain "dog in the manger" tactics that also threaten to restrain legitimate development of the water we drink and the power that runs our machinery. The former are well intentioned, but ill-advised, the latter selfishly organized and too well advised. They foster nothing but wind power. Therefore, every legitimate hydro-power company is vitally interested in presenting their side of the case for intelligent Governmental

action. In this matter we would suggest that the power companies want a specific proposition, definite data upon which to figure costs. For this purpose the "Journal of Electricity, Power and Gas" offers its columns as the medium for an exchange of ideas.

ELECTRICAL CONTRACTORS' PICNIC.

A picnic is to be held under the auspices of the San Francisco Electrical Contractors' Association, on August 8, 1908, at El Campo. All men interested in electrical work, together with their families, are to be invited, including the jobbers and manufacturing agents. The committee having the affair in hand have several novel schemes planned, details of which are to be announced later. Meanwhile, reserve August 8th for the picnic.

PERSONAL.

C. J. Lilley, of the Big Creek Power Company, is in San Francisco this week.

G. R. Murphy, of the Electric Storage Battery Co., is making a short trip to Spokane, Wash.

Mr. Jas. Neill, president of the Yosemite Gold Dredging & Mining Company, is at the Fairmont.

R. J. Hanford, of the Folsom Development Company, visited San Francisco on one of his recent trips.

T. E. Collins, San Francisco salesman of the Westinghouse Electric & Mfg. Company, has rteurned from a ten days' trip to Bakersfield.

J. C. Hayes, and Benj. Maddox, of the Mount Whitney Power Company, of Visalia, included San Francisco in the course of an automobile trip throughout the State.

T. W. Seimon, treasurer of the Westinghouse Electric & Mfg. Co., of Pittsburg, has been in San Francisco during the past week, and leaves Sunday for Pittsburg, by way of Seattle.

James Goodwin, manager of the Power, Transit & Light Company, of Bakersfield, California, has been in San Francisco on a short visit after his return from a vacation at Santa Cruz.

H. T. Van Riper, traveling salesman for the Pacific Electric Heating Company, of Ontario, California, will spend the next two weeks in San Francisco and vicinity, after which he will go throughout the Northwest, and then sail for Australia, to establish an agency for the company.

Ralph L. Phelps has returned to San Francisco after a six weeks' trip East. He has been appointed Pacific Coast manager of The Safety Insulated Wire & Cable Co., of 114 Liberty Street, New York. Mr. Phelps is receiving many congratulations upon his return to the electrical business, in which he has won many friends.

NEW AGENCIES.

The Knoblock-Heideman Mfg. Co., of South Bend, Ind., have appointed Otis & Squires, 111 New Montgomery Street, San Francisco, as their local agents. A large stock of "Quick Action" igniting devices will soon be ready for delivery.

The Safety Insulated Wire & Cable Co., of 114 Liberty Street, New York City, will open a branch office in San Francisco, with R. L. Phelps as Pacific Coast manager. A large supply of rubber-covered wire, submarine cable, lead-covered power cable, lamp cord, and insulated wire will be carried in stock. Offices have been opened at 714 Balboa Building, Second and Market Streets.

(Continued from page 9.)

Now, about form: It need not be in any particular form, so long that it is certainly to be seen on the face of it who is the maker, to whom it is payable, the sum to be paid, and an absolute promise to pay it. This applies directly to individuals. In the case of corporations there are certain necessary requisites to establish validity, the principal one being the setting forth on the face of the note that same has been authorized by the Board of Directors at a regular meeting at which a majority were present. The note must bear the seal of the corporation, and be signed by officers who have the authority to do so.

Who may be the parties to a note? All persons capable of entering into a contract. It may be well to make special mention of married women, as occasionally contracts are entered into with them. A note made by a married woman is a valid and binding obligation, for she has the right to make it, but such a note signed by her alone can only be collected out of her separate property. Such property would include all she owned before marriage and any which she acquires after marriage, by gift, will, descent to her as heir, and the rents and profits of such property.

To deal thoroughly with the subject of notes would require many pages, so I have decided to make a few general statements, rather than go into details.

A promissory note must be in writing, not necessarily in ink, as pencil may be used. Certain parts may be printed or typewritten.

It must be for the payment of money, and money only. The amount must be absolute and not subject to contingencies.

A time for payment should be stated, but omission does not invalidate. Neither is it necessary that a place of payment should be mentioned. Nor is a note not dated invalid. In case of suit it will be considered as dated at time of execution, and it will be allowed to be shown by verbal testimony when the same was signed, or when it was intended by the parties to take effect.

The signature of the maker may appear at any place—top, bottom, sides, or center, and if spelled incorrectly would not affect validity providing it can be determined by the face, or an endorsement, who the maker is. The payee need not be named in person if some one be indicated, such as "to bearer," "to holder," "to order," etc.

A note made payable "on or before" a certain date gives the maker the privilege of paying before date mentioned, but does not give the holder the privilege of collecting before due date.

A note can only be legally negotiable when "or order" or "or bearer" follows name of payee.

Makers of joint and several notes are liable collectively and indivdually.

As regards interest, the California law does not recognize usury, and any rate may be agreed upon. Should the interest not be mentioned and same is prayed for in suit, 7 per cent. might be allowed, as this is the legal rate.

Notes should be presented for payment on due dates. This is particularly important if the same bears endorsements.

In this State a note is outlawed if allowed to run more than four years after due date. The renewal of such a note must constitute a written acknowledgment of the debt and an unconditional promise to pay it.

Now, to sum up: Be careful who you trust. Look at the extension of credit as the loaning of hard cash.

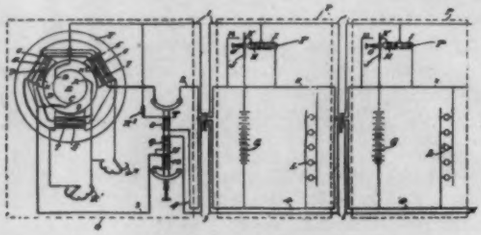
Watch collections. It pays. When an account is due it is your indisputable right to ask for it, and your part of the contract having been carried out the debtor must close the transaction by paying as agreed.

Notes are best if you cannot get the money. They prove your claim, and they bear interest, but be sure you get the right kind.

PATENTS

TRAIN-LIGHTING SYSTEM. 891,221. Joseph L. Woodbridge, Philadelphia, Pa.

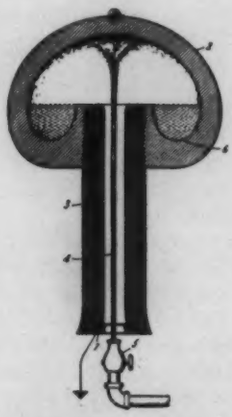
In combination a direct current generator adapted to develop two different voltages from a single armature winding and commutator; three brushes bearing on the commutator, whereof two are arranged to collect current at two different potentials with respect to the third; three conductors constituting a high potential and a low potential circuit with a common return, automatic means for



making connection between circuits and brushes when the potential of the generator exceeds a certain limit; translating devices connected between the low potential conductor and the common return; a storage battery connected at one terminal to the common return; and means adapted to connect the other battery terminal to the high potential conductor when the difference of potential between the high and low potential conductors exceeds a certain limit, and at othe times to the low potential conductor.

LIGHTNING ARRESTER. 890,679. Ezra B. Merriam, Schenectady, N. Y., assignor to General Electric Company.

In a protective device, the combination of means for



establishing a jet of liquid as a discharge path for abnormal current, and means for utilizing the vaporizing action of a heavy discharge through said liquid to develop a high velocity blast assisting in the interruption of said discharge.

PROCESS FOR MANUFACTURING THE FILAMENTS OF ELECTRIC INCANDESCENT LAMPS.

891,223. Werner von Bolton, Charlottenburg, Germany, assignor to Siemens & Halske Aktiengesellschaft, Berlin, Germany.

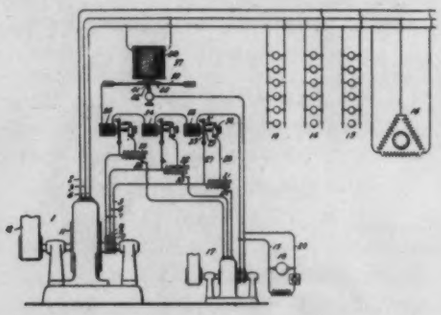
DAMPER FOR THE UPPER HARMONICS OF ALTERNATING ELECTRIC CURRENTS. 890,776. Maurice Leblanc, Paris, France, assignor to Westinghouse Electric and Manufacturing Company.

An alternating current machine having a harmonic-damper circuit made of a resistance sufficiently high to

effectively suppress upper harmonics, as herein defined, and a winding in inductive proximity thereto of a self-induction whichi s made low for the low-frequency currents flowing therein but high for the currents of upper harmonic frequency, whereby the winding does not act as a screen for the damper.

REGULATION OF DYNAMO-ELECTRIC MACHINES. 890,722. Charles P. Steinmetz, Schenectady, N. Y., assignor to General Electric Company.

The combination of a dynamo electric machine having a multiphase exciting winding and a multiphase gen-

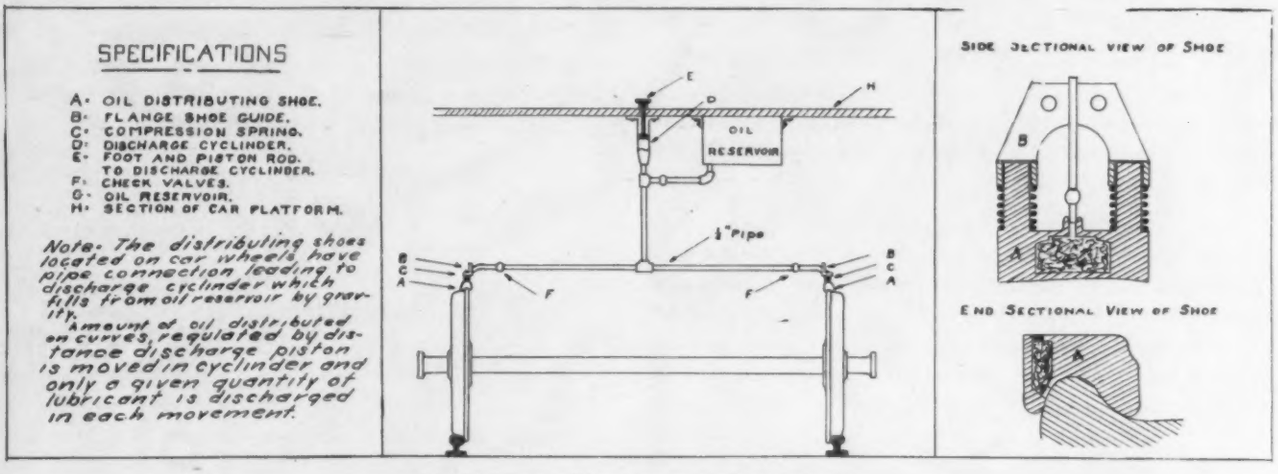


erating winding, a low frequency exciting circuit connected to said exciting winding, voltage consuming devices in said exciting circut, and means responsive to variation of voltage of said generating winding for controlling said voltage consuming devices.

INDUSTRIAL

CURVE LUBRICATION FOR STREET RAILWAYS.

A system that reduces the cost of maintaining car wheels by reducing the ware which occurs between wheel flanges and outer rail on curves, is illustrated on this page. It consists of an oil receptacle conveniently located for filling, connected by suitable piping with the distributing shoes placed and held substantially on the two forward wheels on each end of car. A cylinder under the platform of the car is operated by a piston, the stem of which extends up through the flooring and is handled by the motorman pressing down a foot-piece which projects upward and slightly above the flooring of car. The motorman, by pressing this foot-piece downward, displaces the desired amount of oil, which is conveyed by piping to distributing shoes, thence to wheel flange and rail. A simple device, which oils track curves by conveying, distributing and confining the lubricant to the point of contact between flanges and rails. J. C. Martin Sons Company, San Francisco, California, are the manufacturers.


SPECIFICATIONS
A. OIL DISTRIBUTING SHOE.
B. FLANGE SHOE GUIDE.
C. COMPRESSION SPRING.
D. DISCHARGE CYLINDER.
E. FOOT AND PISTON ROD.
TO DISCHARGE CYLINDER.
F. CHECK VALVES.
G. OIL RESERVOIR.
H. SECTION OF CAR PLATFORM.
Note. The distributing shoes located on car wheels, have pipe connection leading to discharge cylinder which fills from oil reservoir by gravity.
Amount of oil distributed on curves, regulated by distance discharge piston is moved in cylinder and only a given quantity of lubricant is discharged in each movement.
OIL RESERVOIR
1" Pipe
SIDE SECTIONAL VIEW OF SHOE
END SECTIONAL VIEW OF SHOE

CURVE LUBRICATION FOR STREET RAILWAYS.

STERLING ELECTRIC CATALOGUE.

The Sterling Electric Company, 133 to 139 New Montgomery Street, San Francisco, California, will have their General Catalogue Number Fifteen ready for distribution early in July. This is undoubtedly the most exhaustive list of hig-grade electric-light supplies and construction material yet issued by any Pacific Coast firm. It embodies the result of two years of untiring effort by Mr. W. L. Goodwin, the vice-president and general manager. Just as truly as clothes mark the man, so does a catalogue mark the house. Judging from the general appearance of this book, credence is readily accorded to the Sterling claim that they carry the most complete stock of electric-light supplies, construction material, tools, specialties, etc., in the country, and have unsurpassed facilities for prompt shipments.

The volume weights three pounds and contains six hundred pages, 6½x10 inches. The binding, press-work and paper are so good that its durability and usefulness will be unimpaired after years of continuous service. The cover is of brown cloth and board, upon which is printed in yellow, the Sterling trade-marks, a lone pine and a grizzly bear.

The illustrations are particularly worthy of note, as they ably supplement the text in describing the various articles listed. To the prospective out-of-town purchaser they are almost as good as seeing the samples in stock. List prices are also given for all material listed. The contents are so varied and numerous that space permits of but a brief review. The catalogue is conveniently arranged according to subject.

Sockets and receptacles of all designs and for all imaginable services are listed in the first section. They include General Electric, Hubbell, Paiste, Federal Electric, Fielding Bryant, and Neugard specialties. Over eighty pages are devoted to switches and circuit breakers. The makes represented include G. E., Perkins, Diamond "H," H. & H., Bryant and Hill, the last-named being especially detailed. Weston, Norton, Bristol, G. E., Dongan, Queen, and other makes of instruments for both switch-board testing purposes, are next described. Lightning arresters, panel-boards and table-boards, together with G. E. cut-outs and fuses, complete this division.

The following sixty pages give prices on wires and cables for all uses. Excellent rules and tables for line construction have been included. Conduits, whether of iron, flexible steel, vitrified material or non-metallic material, together with switch and outlet boxes, conclude the section.

Next comes the long list of insulators, porcelain specialties, fixtures, tools and specialties used in overhead light, power and railway work. This display takes one hundred pages more. A small amount of space is devoted to motors and supplies for both alternating-current and direct-current work, including all starting and regulating apparatus. Ventilating fans, G. E. transformers, and mercury arc rectifiers finish this list.

Lamps, lighting supplies, fixtures and globes occupy the succeeding 120 pages. These include Edison (G. E.) incandescent lamps, Hylo miniatures, Dale specialties Fane's fixtures and adjustable brackets, Hubbell and Benjamin clusters, and various portables and novelties. Fittings, holders, guards, and glassware are also found here. Federal Electric signs end this part. Immediately following are all kinds of electric heating and cooking apparatus.

Marine supplies, batteries, bells, pushes, annunciators, alarm and gas-lighting apparatus, bing one to the final subdivision of telephones and telegraph, the volume being concluded with a good index, facilitating rapid reference. Mr. Goodwin has devised an excellent code system for the use of the out-of-town customers, whose accommodation he especially seeks. This catalogue will be sent to interested parties upon request.

NEWS NOTES

WATERWORKS.

San Juan, Cal.—The Town Board has decided to call a bond election for the purpose of installing a water system in San Juan.

Brawley, Cal.—Manager Philo Jones, of the Brawley Town & Improvement Co., states that water pipe will be extended to cover all available property this fall at an expense of $10,000.

Oakland, Cal.—The Board of Supervisors has passed to print an ordinance providing for the construction of a $60,000 salt water pumping plant, with auxiliary piping system for fire protection.

San Francisco, Cal.—Pursuant to the written consent of the holders of more than two-thirds of the capital stock of the Contra Costa Water Company, that company has removed its principal place of business from San Francisco to Oakland.

Coachella, Cal.—The Coachella Valley Development Company has submitted a plan for a water system for the town of Thermal. The proposition is waiting for endorsement of the Board of Supervisors of the county.

San Rafael, Cal.—The Marin County Water Company has brought suit in the U. S. Circuit Court against the city of San Rafael, hoping thereby to compel the Board of Trustees of that municipality to allow the corporation a higher water rate for the ensuing year than was allowed in the ordinance adopted last Monday.

Anderson, Cal.—The Anderson Water Co. has decided to dig a well twenty feet in diameter, install a centrifugal pump, and draw on the underground river for water onthrow into the reservoir. The Northern California Power Co. will furnish the electrical power as soon as a pole line can be built. Twelve hundred feet of twelve-inch pipe will connect the well with the reservoir west of Anderson.

Williams, Ariz.—The Grand Canyon Electric Light & Power Co. has decided to ask the city for a water works franchise. The first plan was to have the city issue $100,000 bonds, take over the light plant, the Caufman dam and site, and the Nellis water system, all for $75,000, and expend the remaining $25,000 for necessary improvements. Since the citizens as a whole did not seem to be enthusiastically in favor of bonding the city, the light company has decided to ask for a franchise, and if granted one, will put in water works and operate the system in connection with its business.

Sausalito, Cal.—President F. P. Howard, of the new Lagunitas Water Co., in Marin County, has announced his plans for building a tunnel through the Fairfax hills, connecting his proposed reservoir on Lagunitas Creek with the towns of Southern Marin, without having to resort to pumping operations, such as once seemed inevitable on account of the location of his water rights. The Marin County Water Co. has had for over two years a plan to construct a reservoir of its own on the headwaters of the Lagunitas Creek, on the site at the top of the Fairfax-Bolinas grade. The dam for this reservoir it has been planned to erect at the boundary line between the company's own property and the land controlled by the Lagunitas Water Co. Much litigation is pending in this struggle between the two corporations, but Howard declares that, even if every suit would be decided against him, the ultimate success of his water project would not be impaired.

INCORPORATIONS.

San Francisco, Cal.—The Postal Telegraph Cable Co. has been incorporated with a capital stock of $250,000 by J. S. Blake, Geo. W. Holt and W. Hearn.

Mexico City, Mex.—News from Cuidad Guerrero says that a company with a capital stock of $22,000 has been organized to bring drinking water into the city.

Fresno, Cal.—The North Limited Oil Co. has been incorporated with a capital stock of $200,000 by J. W. Pauson, C. G. Wilcox, H. H. Welsh, A. O. Hickman and A. J. Graham.

Fresno, Cal.—The West Coalinga Oil Co. has been incorporated with a capital stock of $50,000 by Eugene Adams, H. S. Davis, C. V. Gormley, A. P. May, John Wells and others.

Fresno, Cal.—The North Extension Oil Co. has been incorporated with a capital stock of $500,000 by J. W. Pauson, of San Francisco; C. G. Wilcox, of Oakland, and H. H. Welsh, of Fresno.

Coalinga, Cal.—The West Coalinga Oil Co. has filed amended articles of incorporation, having reduced the number of directors to five. The following compose the new directory: A. P. May, J. M. Robertson, L. L. Phelps, John Mills and H. S. Davis. The officers for the year are: John Mills, president; A. P. May, secretary.

Bakersfield, Cal.—The Topaz Oil Co., composed of local capitalists, which will begin development in the Sunset field, has been organized with a capital of $50,000, with $10,000 paid in. The stockholders of the new company are C. W. Ball, J. H. Sheridan, R. H. Avery, C. A. Metcalfe, Chas. Dickinson, Harry W. Thomas, T. M. Young, O. McReynolds, Chas. Hill, D. McFarland, Phil Blankenship, Dr. W. S. Fowler, Ira Hochheimer, Messrs. Inglis, Stevens and Wallace. The directors are J. H. Sheridan, O. McReynolds, Robert H. Avery, H. W. Thomas and Chas. Ball.

City of Mexico.—Within the course of a few weeks surveys will be commenced, and work of locating the pipe line the Huasteca Petroleum Co. will construct up to Central Mesa and Mexico City will be undertaken.

OIL.

Bakersfield, Cal.—The Topaz Oil Company will do development work on the southeast corner of Sec. 12 and the northwest corner of Sec. 18. It has possession of forty acres of proven valuable oil land, and on the section line is a 100-barrel well of fine nineteen gravity oil.

San Bernardino, Cal.—An oil excitement eclipsing all former ones on the desert has broken out in the vicinity of Daggett and hundreds of prospectors are hastening to the territory five miles southwest of town, where already 2400 acres have been located. Indications that the ground is oil-bearing are good.

Bakersfield, Cal.—Operations in the Midway have been resumed after a shut-down of a week or more, due to the lack of water. The air-compressor, which was installed by H. C. Stratton, of the Oregon Midway, at water well No. 1, for furnishing the members of the Operators Company with water, has been completed.

Santa Maria, Cal.—The Graciosa Oil Co., operating in the Santa Maria field, cannot make good on the 10,000,000 barrel Japanese oil contract, despite the fact that the cement process has shut off water in the wells of that and surrounding properties. It appears that a portion of the oil stratum also has been cemented in, thereby reducing the production of wells south of the Newlove property. The Graciosa company, two months ago, sublet the Japanese contract, confidently expecting the "cured" wells to bring the production to the desired point. However, the wells of the company are increasing in output daily.

Los Angeles, Cal.—Charles S. Young, one of the best known oil men in California, has filed a sensational suit in the Superior Court against Timothy Spellacy, another of the most prominent oil men in the State. Mr. Young, in his complaint, asks that Mr. Spellacy be required to deliver to him 250,000 shares of Mascot Oil stock and 100,000 shares of Illinois Crude Oil stock claimed by him, and alleged to be held by Mr. Spellacy in trust, or in lieu thereof for judgment to the amount of $2,140,000, the stocks' estimated value, for $500,000 for damage to his business, credit and standing from the alleged withholding of the same, and another $500,000 for exemplary damages, a total of $3,140,000. for an accounting of the trusteeship and for an injunction restraining Mr. Spellacy from transferring any stock of the two corporations pending the suit's trial.

Bakersfield, Cal.—Tests are being made in Sunset, Kern River and Coalinga, with a system of raising oil by compressed air, worked out by S. J. Smith, of the Pacific Coast Manufacturing Co. It has been employed for three months by the Sunset Road Oil Co. to handle the ten to eleven gravity, eighty per cent asphalt petroleum, that can scarcely be lifted by pumps. It has done well. About three weeks ago the Peerless installed this system on Kern River on three wells which had run to water, but which had to be pumped to protect others, although they produced almost no oil. Since the change, they have yielded from 100 to 150 barrels of oil daily, with 500 to 1500 of water and sediment. The method is also used on the Angeles at Coalinga. The greatest interest is taken by operators in the results achieved by the Peerless. If results continue, it may mean much for Kern River, especially for the south of the field, where the water trouble is worse. It is quite likely that other companies will seek to adopt it.

TRANSMISSION.

Red Bluff, Cal.—Harry L. Shannon is engaged in developing a power proposition on Bear Creek, fifteen miles east of Redding, to be known as the Shannon Power Co.

Florence, Cal.—Within the next week John B. Morris, of Erie, Pa., and Robert E. Archibald, of San Francisco, will let a contract for the construction of two large power plants, one on Big Creek and one on Alder Creek, in the Florence mining district.

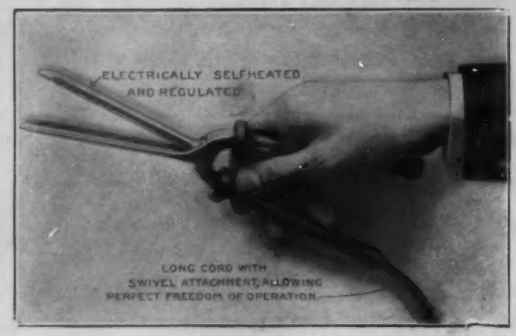
San Jose, Cal.—The Supervisors have granted the Tuolumne Water Power Co. a fifty year franchise to use the public roads of the county for its poles and wires, the company to pay the county 2 per cent of its gross receipts after the expiration of five years.

Reno, Nev.—A movement is on foot to establish at Chalk Mountain, between Wonder and Fairview, Nevada, a power station for the distribution of electricity throughout the mining district. Originators of the plan are R. H. McLaughlin, of Fairview, and Roy Ridge, of Reno.

Oroville, Cal.—The engineers of the Great Western Power Co. are having considerable trouble in locating sites for the towers that are to carry the power cables from the plant at Big Bend. In the level and hilly country the schedule of 750 feet apart can be easily maintained, but as the rough country approaching Island Bar is encountered, there are instances where the towers must be placed 1250 feet apart, for the reason that a feasible site for the foundations, which require a space eighteen feet square, cannot be had inside that distance without putting the towers too close together.

Willows, Cal.—A meeting of the directors and stockholders of the Snow Mountain Power Company was held in the Bank of Willows, June 21st, and the following directors were chosen: C. H. Glenn, of Fouts Springs, president; B. H. Burton, of Colusa, vice-president; C. R. Wickes, of Willows, secretary and treasurer; C. W. Tuttle, of Colusa; J. F. Campbell, of Colusa; H. C. Stovall, of Williams; A. S. Lindstrom, of Willows. It was given out at this meeting that the company would begin actual work on the power plant in August. It will be the aim of the company to complete the work this season.

Santa Cruz, Cal.—The office equipment of the Coast Counties Light & Power Co. has been moved from the former office on Pacific Avenue, opposite Elm Street, to the Union Traction buildings, at the foot of Pacific Avenue, corner of Sycamore Street. The boilers of the old Co-operative electric light plant at the beach are being moved across the railroad tracks to Station B, the new concrete power house that has lately been erected. To this equipment will also be added a new 750-kilowatt turbine, which is now en route from Schenectady, N. Y. It is expected that this turbine will be in operation by August 1st, at which time the power facilities of this city will be materially increased.



WILL YOU PUT FLOWERS ON THE GRAVE OF GAS?

Natural gas *is* dying a natural death. So is unnatural gas. Having worried along past its allotted time, it began to give up the ghost when the Electrocurl said, "Present!" It is going, going, going.

Now, let's all get together and make it GONE. Central Stations will find that the Electrocurl is a *great salesman* for *increasing* the day load, that the hairdressers simply *must have it*, and must have current "to make it work." You know what happens when the women *get after* a good thing. Well, that's just what the Electrocurl is up against.

It is almost *criminal* to fail to get acquainted with this latest Vulcan winner. Who are you? You need one or two for *every* hairdresser in your district. All we need is your *order*—get it off your hands *today*.

TRADE VULCAN MARK **Vulcan Electric Heating Co.**
69 West Jackson Blvd., Chicago. 37

VACATION 1908

ISSUED BY THE

Northwestern Pacific Railroad

THE PICTURESQUE ROUTE OF CALIFORNIA

Is Now Ready for Distribution

GIVING FULL INFORMATION IN REGARD TO

Camping Spots, the Location, Accommodations, Attractions, Etc., of Mineral Spring Resorts and Country Homes and Farms where Summer Boarders are taken, with Terms of Board, $7.00 and upwards per Week.

To be had at Ticket Offices, Ferry Building, foot of Market street, and Room 986, James Flood Building (General Offices) San Francisco.

W. S. PALMER, General Manager.
J. J. GEARY, Acting Gen. Pass. & Frt. Agt.

All Kinds of Lamps

California Incandescent Lamp Co.

Kearny 1077 117 New Montgomery St., San Francisco

"FEMCO" Reflectors
40 c. p., 56 watts, 35 1-2c ea.

"HOLABIRD-REYNOLDS" ELECTRIC CO.

116 East 5th St., Los Angeles — 527 Mission St. San Francisco

ELECTRICAL SUPPLIES AT WHOLESALE

Incandescent Lamps in all candle power and voltage.

Tungsten lamps in stock now, 40 and 60 watt.

Weber sockets and receptacles.

WRITE FOR CATALOGUE

BACK EAST CHEAP

Low round trip rate summer excursion tickets sold to Eastern points on these dates:

July 6, 7, 8, 21, 22, 23, 28, 29.
August 17, 18, 24 and 25.
Sept. 15, 16.
Sept. 23, 24, 25 to Kansas City only.

Here are some of the rates:

Omaha	$ 60.00
Council Bluffs	60.00
Kansas City	60.00
Chicago	72.50
St Louis	67.50
New Orleans	67.50
Washington	107.50
Philadelphia	108.50
New York	108.50

Tickets good for three months—some cases longer. Stopovers and choice of routes going and coming.

See nearest agent for details.

SOUTHERN PACIFIC

THE SCHAW-BATCHER COMPANY PIPE WORKS

INCORPORATED

Manufacturers of

RIVETED IRON AND STEEL PIPE

Tanks of all descriptions for Water, Oil and Gas.
Single and Double Well Casing.
Our Specialty: Riveted Pipe for High Pressure.

Engineers and Contractors for the complete installation of Pipe Lines used in the operation of Hydraulic Mines, Power Plants, Water Works, Irrigation, Reclamation, etc. We have special facilities for supplying general supplies for Mills, Mines, etc.

Office, 211 to 219 J St. Works, 15th and B Sts.

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San Francisco Office - - 356 Market Street
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